

PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| Applicant: Hirokazu KANEKIYO et al. | Art Unit: 1742 |
| Serial No.: 09/986,390 | Examiner: J. Sheehan |
| Filed: November 8, 2001 | |
| Title: NANOCOMPOSITE MAGNET AND METHOD FOR PRODUCING SAME | |

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We hereby declare that we are the inventors of the present application.

We hereby declare that we invented all of the subject matter disclosed in U.S. Patent Application No. 09/986,390.

We hereby provide attached Exhibit A that clearly further illustrates and establishes the substantially improved magnetic properties, B_r , H_{ci} , and $(BH)_{max}$ of our claimed invention in the present application.

We hereby declare that the entries in the Table of Exhibit A are accurate.

We hereby declare that Examples 2, 4, and 8-13 in the Table of Exhibit A correspond to Examples 2, 4, and 8-13 in Tables 7 and 8 of our originally filed Specification and are included in the scope of the present claimed invention.

We hereby declare that Examples 21-26 in the Table of Exhibit A are newly provided to further illustrate and establish the substantially improved magnetic properties, B_r , H_{ci} , and $(BH)_{max}$ of our claimed invention in the present application.

We further declare that Examples 21-26 in the Table of Exhibit A are included within the scope of the originally filed specification of the present application and included in the scope of the present claimed invention.

Serial No. 09/986,390
March 17, 2004
Page 2 of 2

We hereby declare that Comparative Examples 1-10 are newly provided to clearly illustrate the substantially improved magnetic properties achieved by the present claimed invention.

We hereby declare that that the substantially improved magnetic properties of our claimed invention were unexpected.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Table

| Sample No. | Composition (at%) | | | | | | | Chill Roller surface velocity m/sec. | Heat treatment temperature °C | Magnetic properties | | |
|----------------|-------------------|-----|-------|-----|-----|-------|--|---|----------------------------------|---------------------|----------------------------|---|
| | Nd | Fe | B | C | Ti | M | | | | Br (mT) | H _{0.1} (kA/m) | (BH) _{max} (kJ/m ³) |
| example 2 | 9.0 | bal | 14.0 | - | 3.0 | Nb1.0 | | 15 | 720 | 867 | 940 | 115 |
| example 4 | 9.0 | bal | 14.0 | - | 4.0 | Nb1.5 | | 15 | 660 | 888 | 925 | 113 |
| comparative 1 | 9.0 | bal | 14.0 | - | 0.0 | Nb1 | | 15 | 620 | 780 | 580 | 71 |
| example 8 | 9.0 | bal | 12.6 | 1.4 | 4.0 | 0 | | 15 | 760 | 810 | 987 | 107 |
| example 9 | 8.0 | bal | 11.2 | 2.8 | 4.0 | Co0.4 | | 15 | 740 | 770 | 668 | 90.6 |
| comparative 2 | 9.0 | bal | 11.2 | 2.8 | 0 | Co0.4 | | 15 | 740 | 730 | 389 | 51 |
| example 10 | 9.0 | bal | 9.9 | 1.1 | 3.0 | Nb0.5 | | 15 | 700 | 880 | 788 | 124 |
| comparative 3 | 9.0 | bal | 9.9 | 1.1 | 0 | Nb0.5 | | 15 | 700 | 760 | 551 | 70 |
| example 11 | 9.0 | bal | 11.7 | 1.3 | 3.0 | 0 | | 15 | 780 | 810 | 764 | 101 |
| comparative 4 | 9.0 | bal | 11.7 | 1.3 | 0 | 0 | | 15 | 780 | 680 | 363 | 53 |
| example 12 | 9.0 | bal | 12.6 | 1.4 | 5.0 | Si1 | | 15 | 740 | 780 | 955 | 100 |
| comparative 5 | 9.0 | bal | 12.6 | 1.4 | 0 | Si1 | | 15 | 740 | 650 | 240 | 38 |
| example 13 | 9.0 | bal | 13.3 | 0.7 | 3.0 | Nb1 | | 15 | 600 | 810 | 1080 | 107 |
| comparative 6 | 9.0 | bal | 13.3 | 0.7 | 0 | Nb1 | | 15 | 640 | 620 | 412 | 49 |
| example 21 | 9.06 | bal | 10.31 | - | 2 | 0 | | 15 | 680 | 877 | 723 | 121 |
| example 22 | 9.00 | bal | 11.00 | - | 3 | 0 | | 15 | 700 | 883 | 892 | 124 |
| example 23 | 8.75 | bal | 11.00 | - | 4 | 0 | | 15 | 700 | 869 | 786 | 120 |
| comparative 7 | 9.08 | bal | 10.31 | - | 0 | 0 | | 15 | 740 | 868 | 488 | 90 |
| example 24 | 9.06 | bal | 10.31 | - | 2 | Cr1 | | 15 | 640 | 845 | 648 | 102 |
| comparative 8 | 9.06 | bal | 10.31 | - | 0 | Cr1 | | 15 | 640 | 850 | 579 | 89 |
| example 25 | 8.00 | bal | 10.30 | - | 3 | Cr3 | | 15 | 660 | 815 | 660 | 94 |
| comparative 9 | 8.00 | bal | 10.30 | - | 0 | Cr3 | | 15 | 660 | 797 | 534 | 80 |
| example 26 | 6.00 | bal | 13.30 | - | 2 | Zr1 | | 15 | 700 | 750 | 627 | 86 |
| comparative 10 | 6.00 | bal | 13.30 | - | 0 | Zr1 | | 15 | 700 | 720 | 484 | 74 |